We claim:

1. A method of detecting a windshear condition in an atmosphere in front of an aircraft, the method comprising the steps of:

(a) projecting a series of optical pulses into an atmosphere ahead of the aircraft;

(b) detecting a series of reflected optical responses from the atmosphere corresponding to reflections from predetermined distances in front of the aircraft;

(c) processing said reflected responses to determine a current relative wind speed at said predetermined distances in front of said aircraft;

(d) processing said current relative wind speeds to determine if a windshear condition exists in front of said aircraft.

2. A method as claimed in claim 1 wherein said step (c) includes the step of:

utilising a global positioning system to determine a current position and the frequency shift of said reflected optical pulse to determine the current relative wind speed at said predetermined distance in front of said aircraft.

3. A method as claimed in claim 1 wherein said optical pulses are derived from a laser having a small wavelength range.

4. A method as claimed in claim 1 wherein said step (c) includes the step of:

determining the Doppler shift in the reflected response utilising a differential Mach-Zehnder Interferometer.

5. A method as claimed in claim 1 wherein said step (c) includes the step of:

storing each of said current relative windspeed for each of said predetermined distances.

6. A method as claimed in claim 1 wherein said method is repeated at regular time intervals of less than 10 seconds.

7. A method as claimed in claim 1 wherein said predetermined distances include a range from substantially 0.2 kilometres to 4.0 kilometres in front of the aircraft.

8. A detection system for detecting the presence of windshear in front of an aircraft, said system comprising:

a laser for transmitting a first portion of a series of optical pulses in front of said aircraft:

a receiver for detecting back scattered light from said transmitted optical pulses;

delay means for delaying a second portion of said series of optical pulses for a time period substantially corresponding to the time of flight of said back scattered light; and

first comparison means for comparing said delayed second portion with said back scattered light so as to determine a wind velocity and direction, relative to said aircraft at a series of distances corresponding to said time of flight of each pulse;

second comparison means for comparing the wind velocity at said series of distances to determine is a windshear event is present.

9. A system as claimed in claim 4 wherein said first comparison means includes a Dual Differential Mach-Zehnder interferometer to indicate the frequency difference and positioning between two light beams, said interferometer comprising:

a First Mach-Zehnder interferometer incorporating a delay in one arm; and

a Second Mach-Zehnder interferometer incorporating a different delay in one arm; and

a means of determining the detected output of the First Mach-Zehnder to indicate the doppler shift in a first light beam; and

a means of determining the output of the Second Mach-Zehnder to indicate a wind velocity at a reflected distance from said aircraft.

10. A Detection System to predict the presence of windshear along the flight path of an aircraft during the critical landing and take off phase comprising:

high powered solid state laser for transmitting a light beam; and

receiver to capture a second back scattered light beam from the first beam; and

a means to provide a third light beam as a sample of the first beam; and

solid state module to delay said third beam for a time corresponding to the transit time of the second light beam and the first light beam; and

solid state detector to detect a differential response of the second light beam to the response of third light beam; and

solid state computer to record and store a wind velocity measurement.